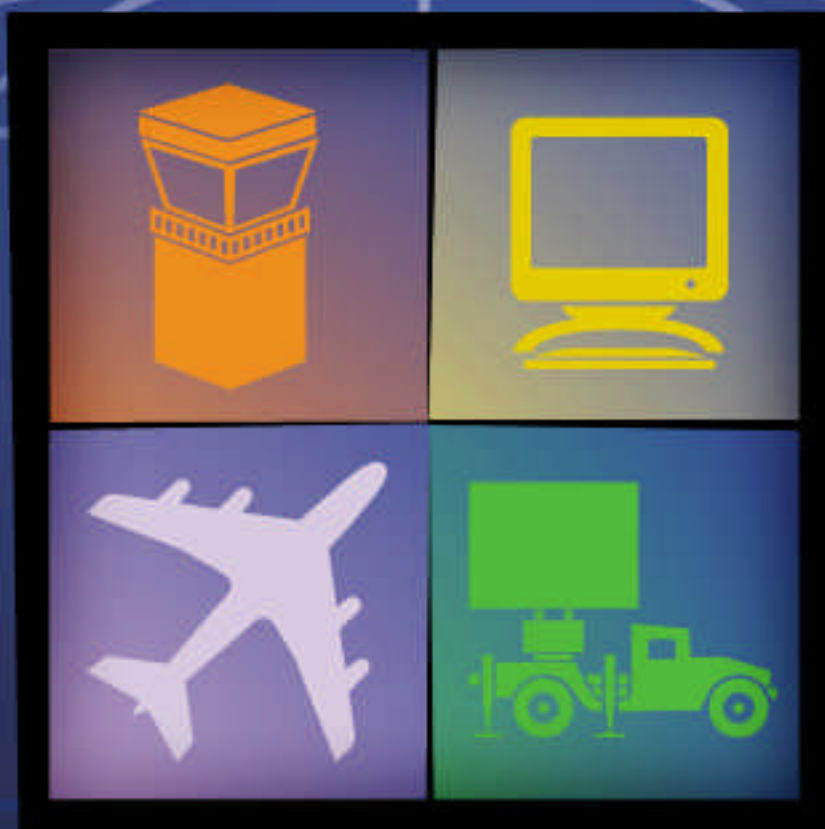


# Sensis

CORPORATION



*Detect the Difference*



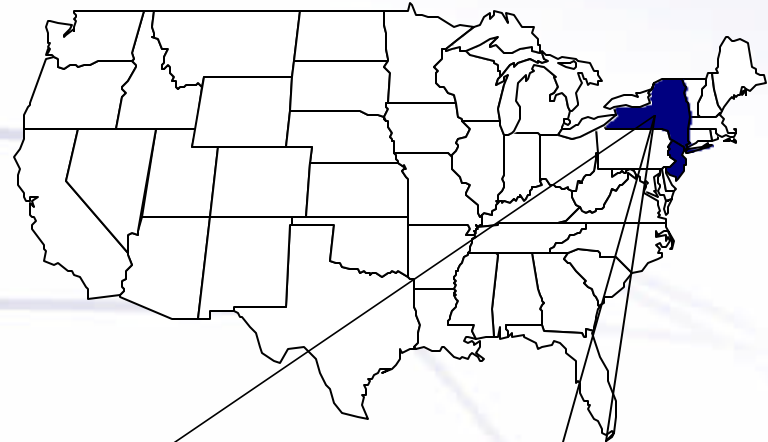
# **Integrated CNS Technologies Conference & Workshop**

Transponder Multilateration for Enhanced  
Air Traffic Control Operations  
April 2002



# Sensis...

- Solving challenging aerospace problems since 1985
- 250 employees
- **Air Traffic Systems & Air Defense Divisions**
- **Facilities**
  - Headquarters - DeWitt, NY
  - Branch Offices - Long Island, NY; Atlantic City, NJ
  - Field Offices - DC, Hawaii, Georgia, Florida, Virginia, Kuala Lumpur & Brisbane





# Transponder Multilateration

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- **Transponder multilateration has been adopted for A-SMGCS applications in North America and in Europe.**
- **Benefits include better coverage, DGPS like accuracy, one second (or higher) update rates, positive identification, all weather operation and a transition path to ADS-B.**
- **Sensis supplied systems operate with ATCRBS, Mode S and ADS-B avionics, requiring no changes to the flight deck.**
- **Transponder multilateration can be fused with other sensors (i.e., ASDE/SMRs and ASRs) to provide users with a best “all sources” picture of the surveillance area.**
- **Using low cost “squitters,” vehicles that operate in the surveillance area can be seen and identified on the same display as aircraft.**
- **Systems have low acquisition, operations and maintenance costs.**



## Multistatic Dependent Surveillance (MDS)

- Transponders periodically transmit encoded messages that are received, time stamped and decoded



Compact, low-cost sensors detect and triangulate transponder signals



# DFW Surface Surveillance



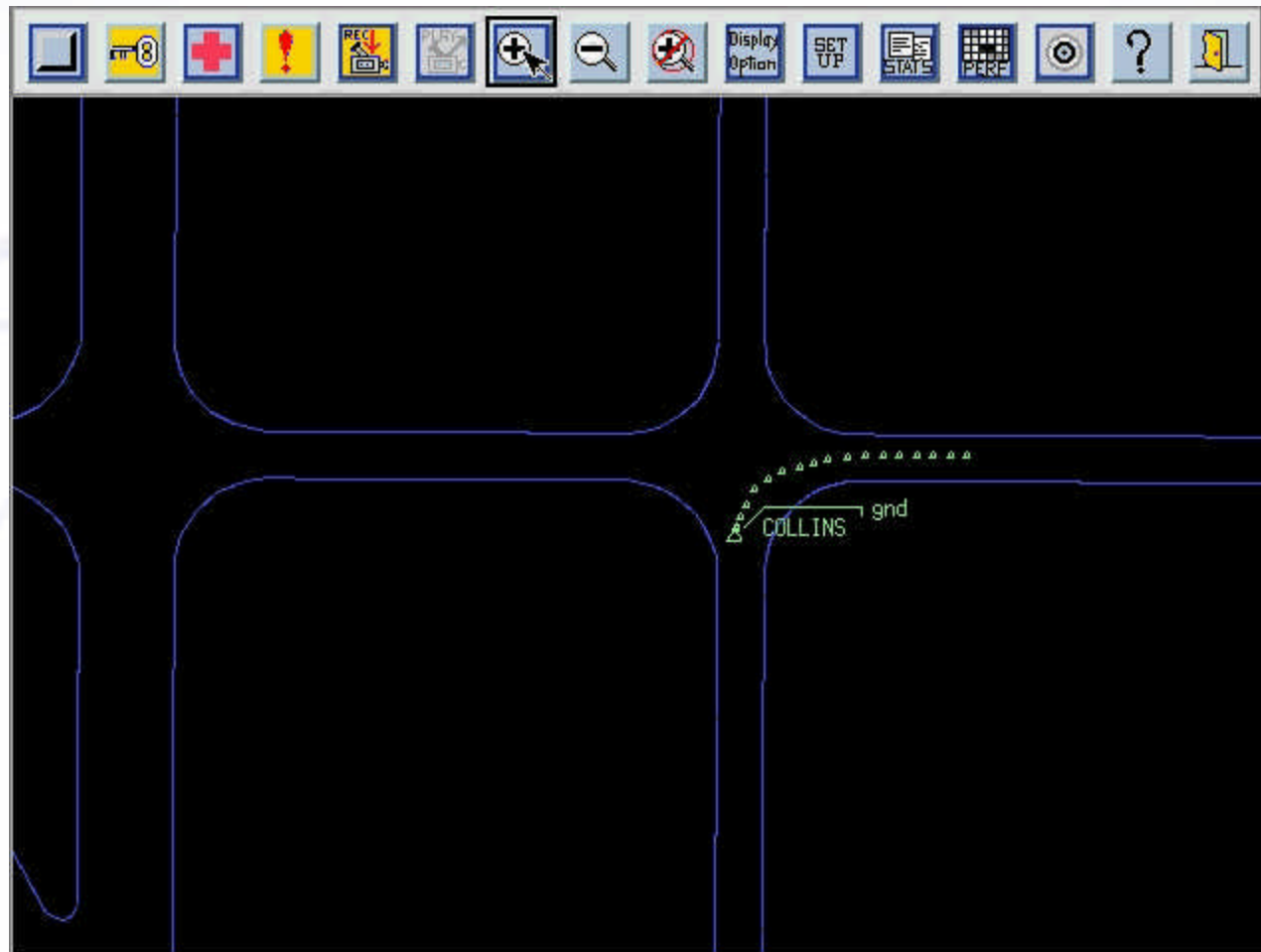


## DFW Wide Area Surveillance



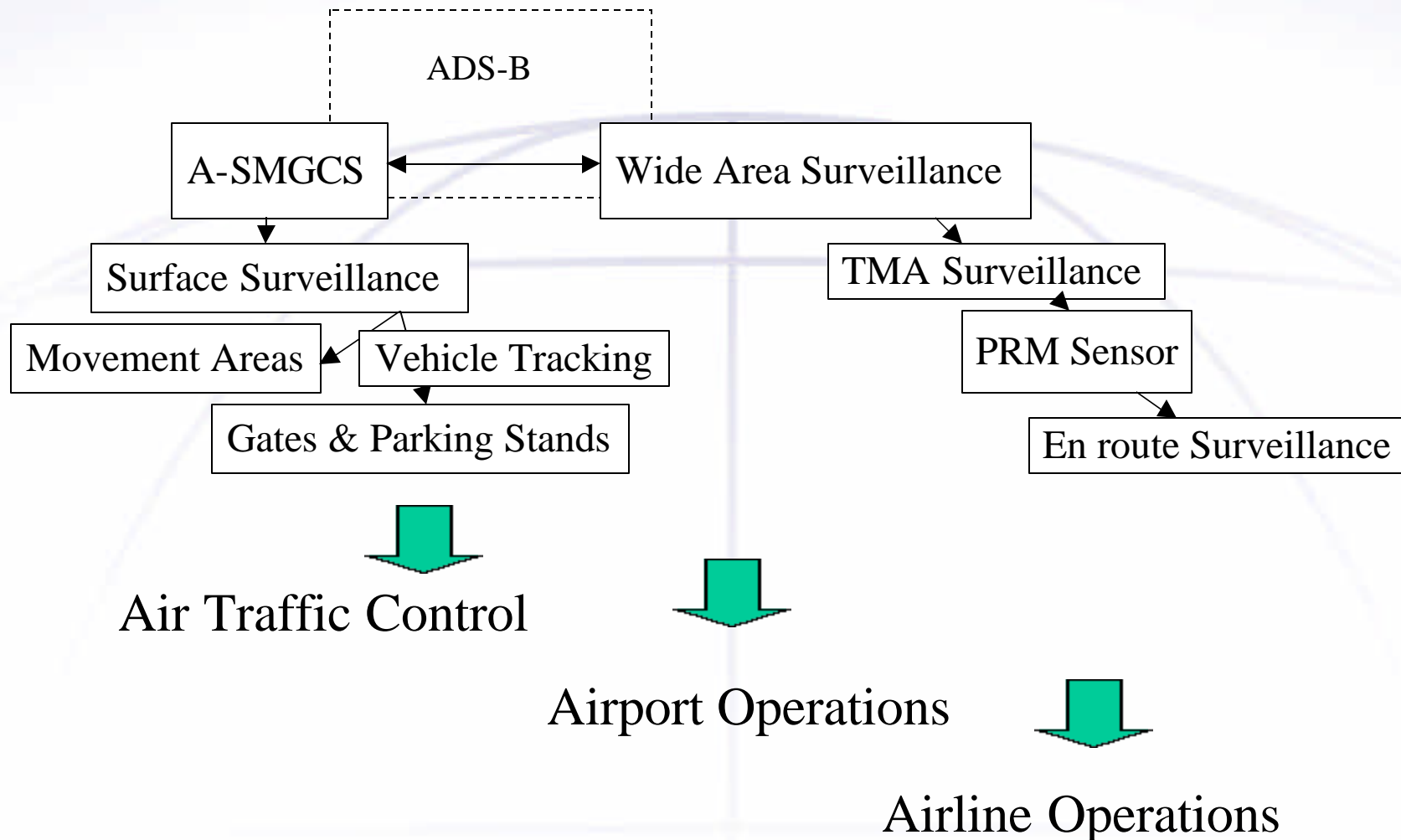


# Vehicle Tracking





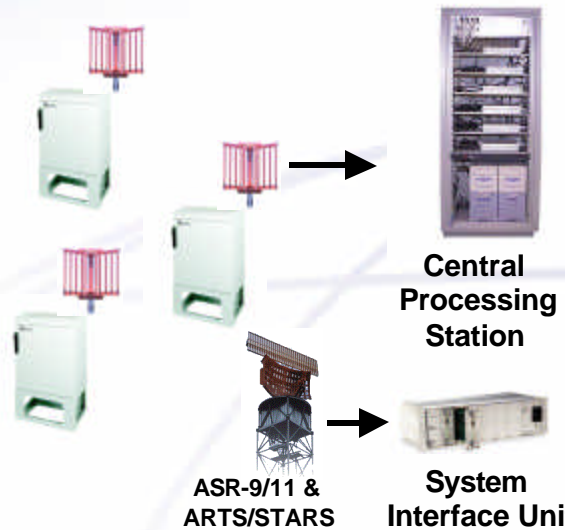
# Evolutionary Applications for Multilateration



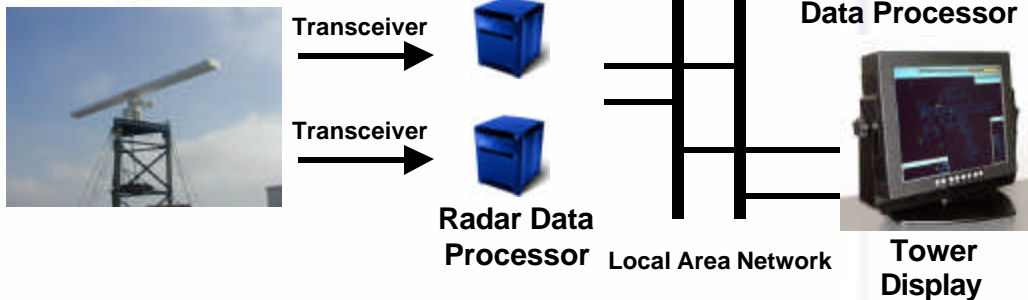


# FAA ASDE-X Program

## Multilateration Sensors



## Surface Movement Radar



- **Contract to Sensis Oct '00**
- **FAA turn-key surface management system**
  - Initially targeted for 25 “2nd-tier” airports
  - Milwaukee named as 1st-article site
  - Depot at Syracuse Airport
- **Basic Capabilities**
  - Surface Surveillance
  - Air Surveillance
  - ADS-B
  - Tower Display
- **Future Enhancements**
  - Safety Logic
  - TIS-B / FIS-B
  - Data Distribution



## ASDE-X Screen





## International Multilateration Projects

### Under Contract

- **Frankfurt Airport**
- **London Heathrow**
- **Zurich & Geneva**
- **Charles de Gaulle**
- **Amsterdam (Schiphol)**
- **Vienna**

### Expected to Procure

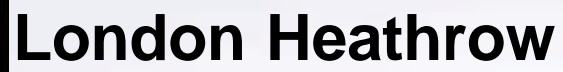
- **Taipei**
- **Hong Kong**
- **Singapore**
- **Incheon**
- **New Bangkok Airport**
- **Sydney**

### Pending Award

- **Brussels**

**Broad Global Acceptance**

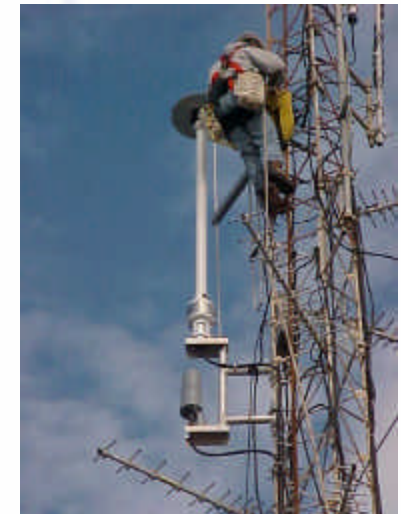






# Helicopter In Flight Tracking System (HITS)

- **Project Sponsor**
  - NASA AMES Research Center, CA
- **Program Goals:**
  - Near term deployment of off shore surveillance coverage in the Gulf of Mexico for over-water operations and low altitude flight trajectories to:
    - Provide Gulf of Mexico offshore helicopter operators with aircraft tracking data
    - Examine potential as a means to improve capacity for the terminal / enroute environment
  - Assess the performance of the HITS system in comparison to existing FAA deployed surveillance systems - ATCBI-6 Radar
    - Volpe National Transportation Center, Cambridge MA to perform formal assessment



**Multilateration/ ADS-B Sensors are  
Installed on Oil Platforms**



# Helicopter In Flight Tracking System (HITS)

**Multilateration/ ADS-B Sensors in the Gulf of Mexico are ASDE-X  
Baseline COTS Equipment**

**ADS-B**  
• 1 sensor  
• New aircraft equipage



**Multilateration**  
• 3 sensors  
• No new equipage

**Central Processing Station**

**PHI Facility, Lafayette, LA**



**HITS Situational Display &  
System Maintenance Terminal**

**PHI Facility, Lafayette, LA**



**Multilateration / ADS-B Sensor**

- Mode -S
- ATRBS
- ADS-B



# Helicopter In Flight Tracking System (HITS)

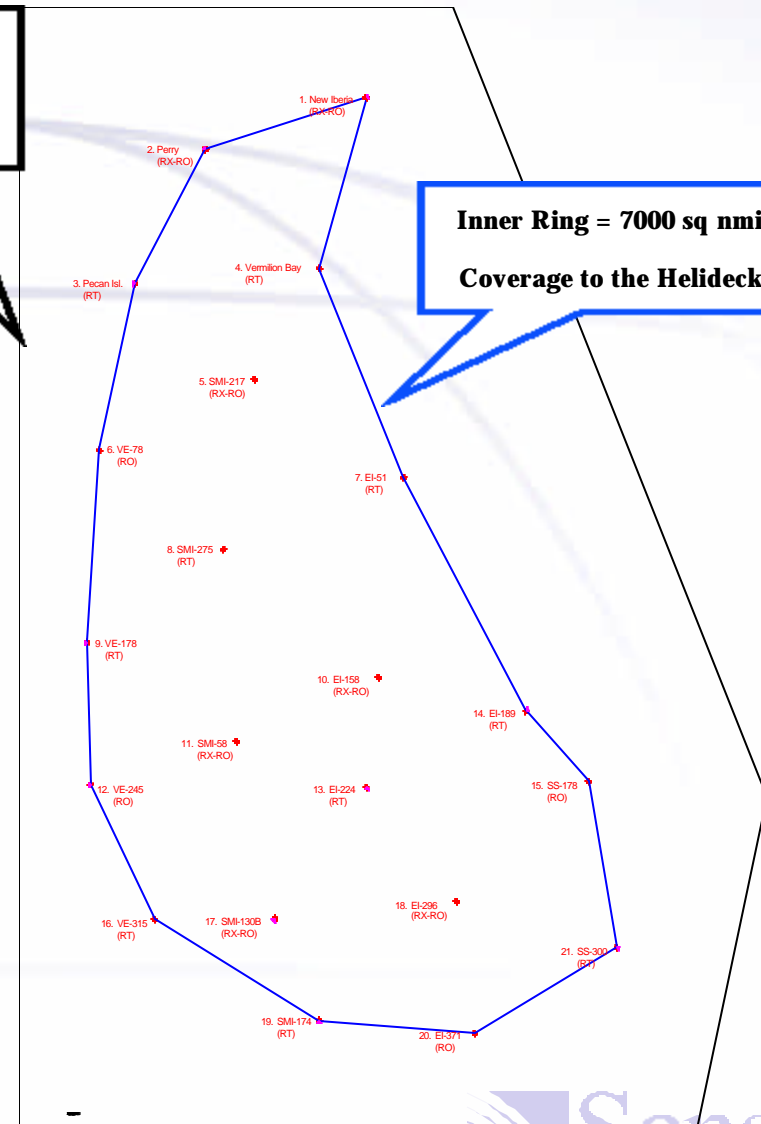
- **Coverage Area**
  - Multilateration Coverage Inner Ring 7000 sq nmi to the Helideck
  - Multilateration Coverage Outer Ring 15,700 sq nmi to 1500ft
  - ADS-B coverage anticipated beyond the outer ring 20,000+ sq nmi with minimum altitude from 100 ft to 1000 ft
- **System Installation- Completed 2/2002**
- **Optimization- In Progress**
  - Mode S - Complete
  - ATCRBS - In Progress

**Outer Ring = 15700 sq nmi**

**Coverage to 1500ft**

**Inner Ring = 7000 sq nmi**

**Coverage to the Helideck**





# Helicopter In Flight Tracking System (HITS)

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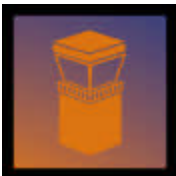


**Installed Multilateration / ADS-B Units in the Gulf of Mexico**

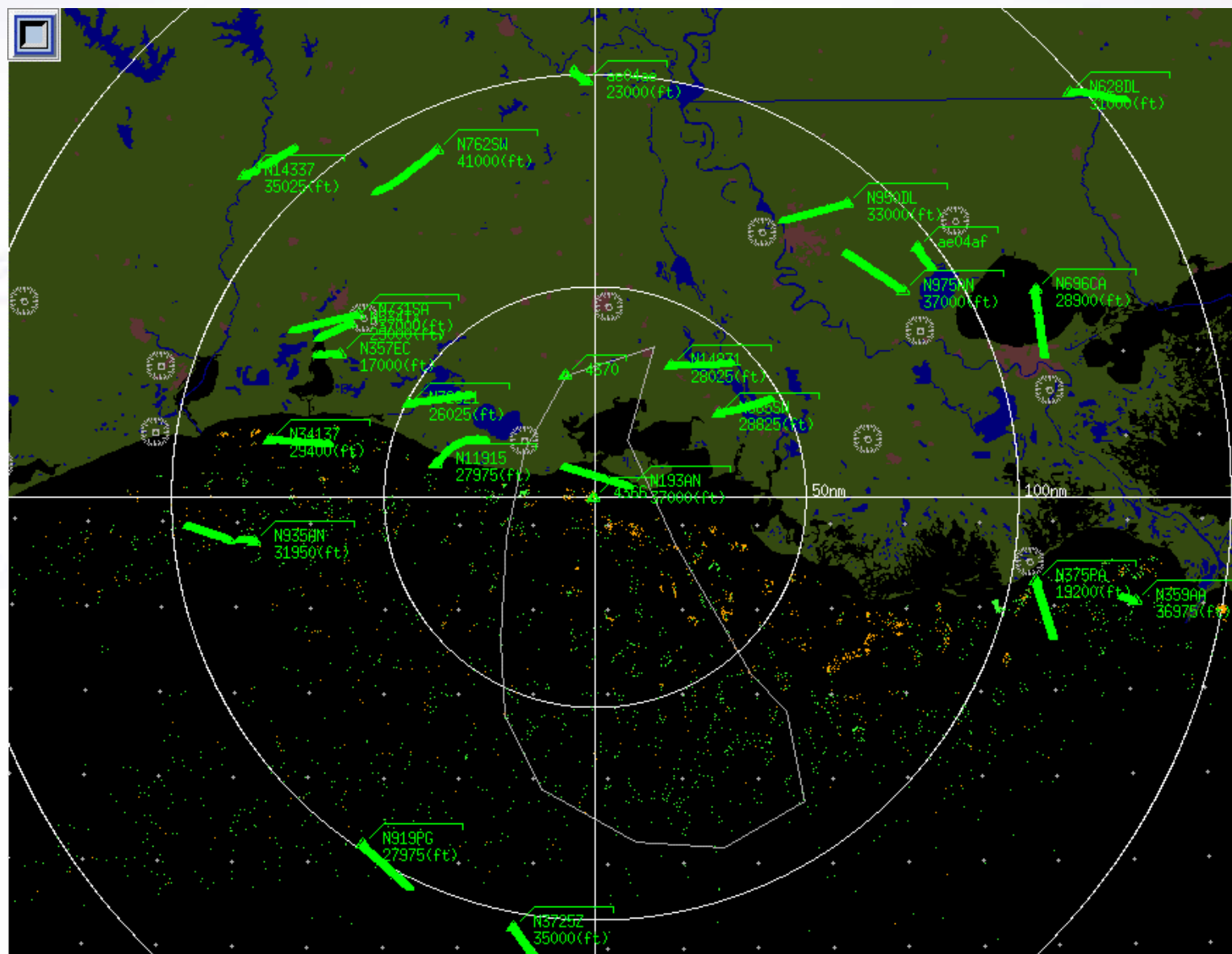


# HITS Mode S Traffic





# HITS Mode S Traffic

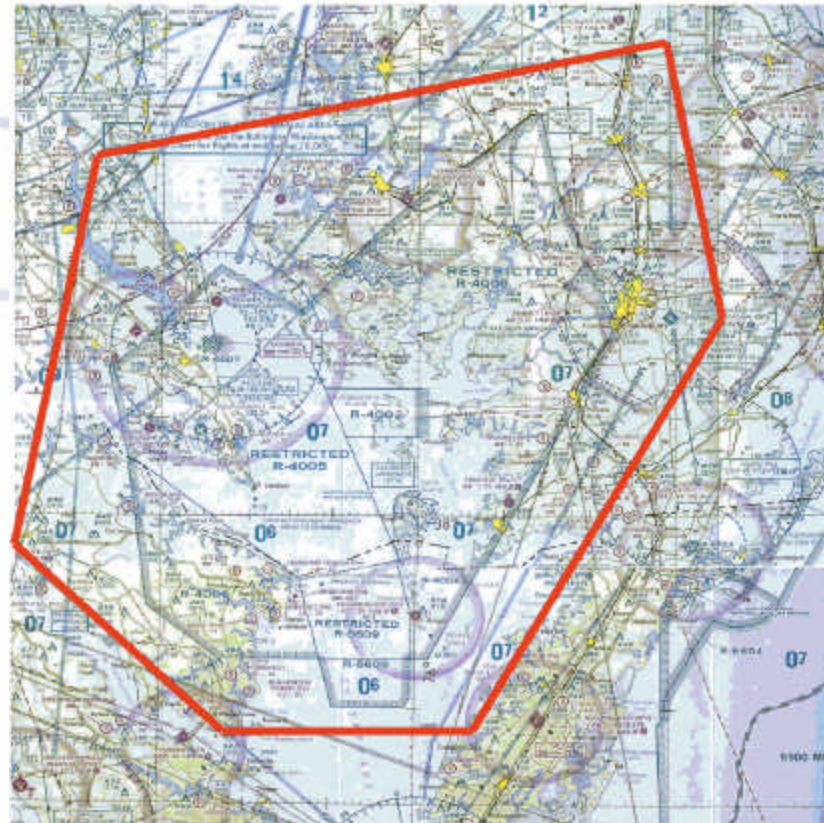




# Patuxent River Naval Air Station

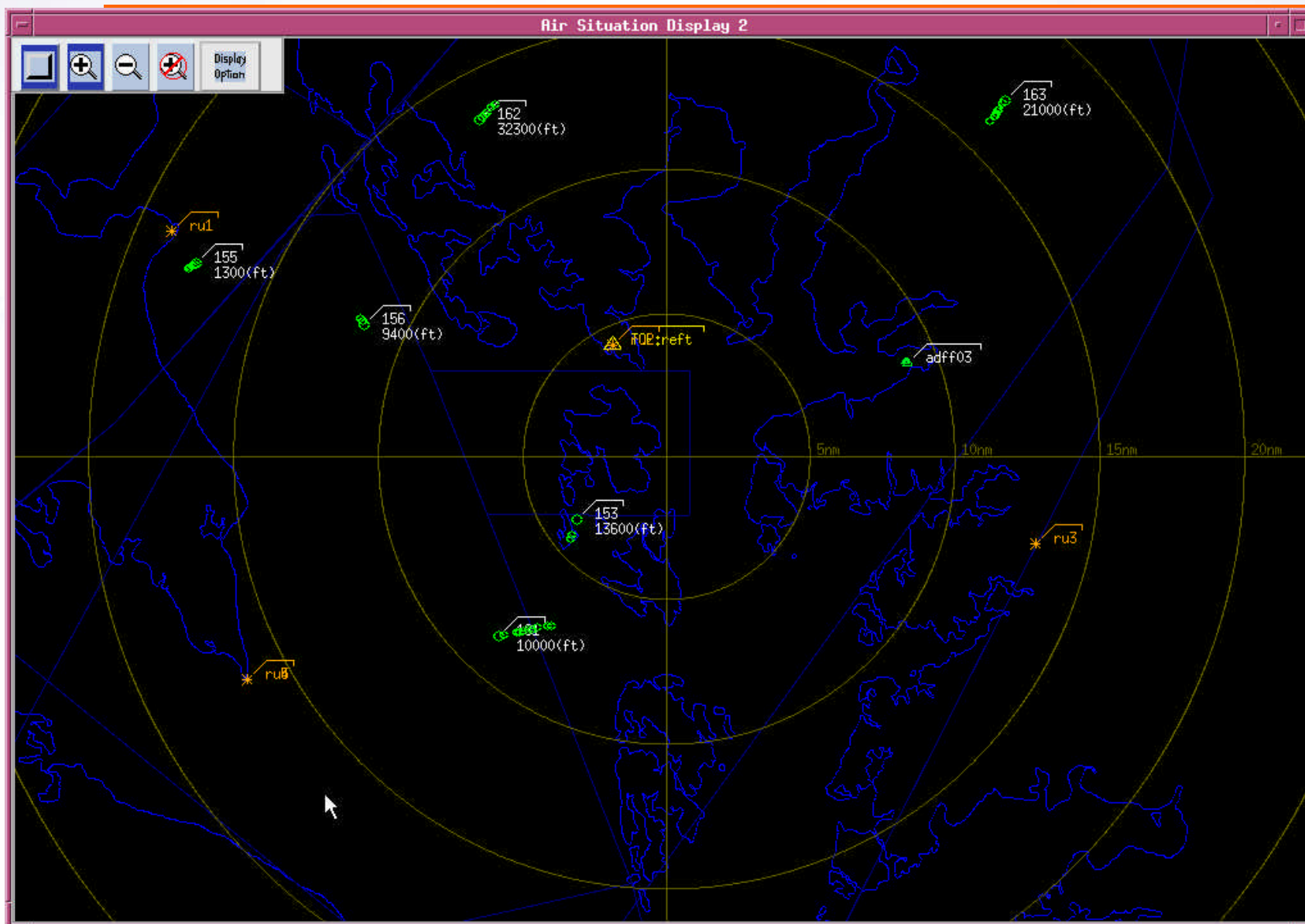
## NAS Patuxent River / US Navy

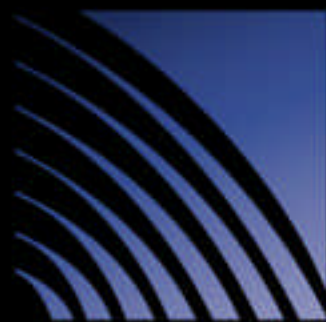
- **Coverage**
  - Area: 600 square miles
  - Altitude: 3500' to 50,000'
  - Installed August 2001
- **Benefits over radar**
  - Higher update rate of 1-sec
  - More precise position estimates
  - Scalable / adaptable coverage





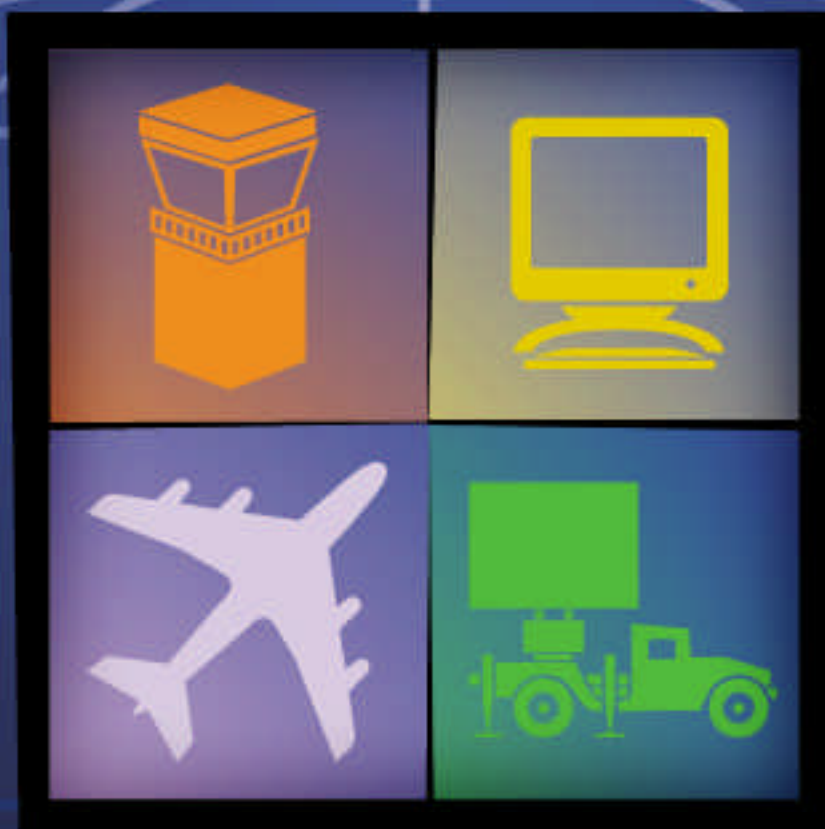
# Patuxent River Naval Air Station





# Sensis

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